

PCT REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference (if desired)(12 characters maximum) **PC-21001834**

Box No. I TITLE OF INVENTION
PLASTIC BOBBIN

Box No. II APPLICANT ☒ This person is also inventor.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

LUNDAHL, Sven-Ingvar
Kårevägen 21
SE-360 51 HOVMANTORP
SWEDEN

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality: **SE**

State (that is, country) of residence: **SE**

This person is applicant for the purposes of: ☒ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

AWAPATENT AB
Box 5117
SE-200 71 MALMÖ
SWEDEN

Telephone No.

+46 40 98 51 00

Facsimile No.

+46 40 26 05 16

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent

Best Available Copy

Box No. V DESIGNATION OF STATES *Mark the applicable check-boxes below; at least one must be marked.*

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ **AP** ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (if other kind of protection or treatment desired, specify on dotted line)
- ☒ **EA** Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, SI Slovenia, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|--|---|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> OM Oman |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> PH Philippines |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> JP Japan | |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> SC Seychelles |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> KR Republic of Korea | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> BZ Belize | <input checked="" type="checkbox"/> KZ Kazakhstan | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> LC Saint Lucia | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> LK Sri Lanka | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> LR Liberia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> CO Colombia | <input checked="" type="checkbox"/> LS Lesotho | <input checked="" type="checkbox"/> TN Tunisia |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> LT Lithuania | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> LU Luxembourg | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> CZ Czech Republic +Utility Model | <input checked="" type="checkbox"/> LV Latvia | |
| <input checked="" type="checkbox"/> DE Germany +Utility Model | <input checked="" type="checkbox"/> MA Morocco | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> DK Denmark +Utility Model | <input checked="" type="checkbox"/> MD Republic of Moldova | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> MG Madagascar | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> EC Ecuador | <input checked="" type="checkbox"/> MN Mongolia | |
| <input checked="" type="checkbox"/> EE Estonia +Utility Model | <input checked="" type="checkbox"/> MW Malawi | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> MX Mexico | <input checked="" type="checkbox"/> VC Saint Vincent and the Grenadines |
| <input checked="" type="checkbox"/> FI Finland +Utility Model | <input checked="" type="checkbox"/> MZ Mozambique | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> NO Norway | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> GD Grenada | | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> GE Georgia | | <input checked="" type="checkbox"/> ZM Zambia |
| <input checked="" type="checkbox"/> GH Ghana | | <input checked="" type="checkbox"/> ZW Zimbabwe |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM				
The priority of the following earlier application(s) is hereby claimed:				
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 30 January 2002	0200251-7	SE		
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items ☒ item (1) ☐ item (2) ☐ item (3) ☐ item (4) ☐ item (5) ☐ other, see Supplemental Box

* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY		
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		
ISA / SE		
Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
Date (day/month/year)	Number	Country (or regional Office)
30/01/2002	0200251-7	SE

Box No. VIII DECLARATIONS		
The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):		Number of declarations
<input type="checkbox"/> Box No. VIII (i)	Declaration as to the identity of the inventor	:
<input type="checkbox"/> Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	:
<input type="checkbox"/> Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	:
<input type="checkbox"/> Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)	:
<input type="checkbox"/> Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	:

Box No. IX CHECK LIST; LANGUAGE OF FILING

This international application contains:		This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):		Number of items
(a) In paper form, the following number of sheets:		1. <input checked="" type="checkbox"/> fee calculation sheet		: 1
request (including declaration sheets)	: 4	2. <input checked="" type="checkbox"/> original separate power of attorney		: 1
description (excluding sequence listings and/or tables related thereto)	: 7	3. <input type="checkbox"/> original general power of attorney		:
claims	: 3	4. <input type="checkbox"/> copy of general power of attorney; reference number, if any:		:
abstract	: 1	5. <input type="checkbox"/> statement explaining lack of signature		:
drawings	: 4	6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s):		:
Sub-total number of sheets	: 19	7. <input type="checkbox"/> translation of international application into (language):		:
sequence listings	:	8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material		:
tables related thereto	:	9. <input type="checkbox"/> sequence listing in computer readable form (indicate type and number of carriers)		:
(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)		(i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application)		:
Total number of sheets	: 19	(ii) <input type="checkbox"/> (only where check-box (b)(i) or (c)(i) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter		:
(b) <input type="checkbox"/> only in computer readable form (Section 801(a)(i))		(iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listings mentioned in left column:		:
(i) <input type="checkbox"/> sequence listings		10. <input type="checkbox"/> tables in computer readable form related to sequence listings (indicate type and number of carriers)		:
(ii) <input type="checkbox"/> tables related thereto		(i) <input type="checkbox"/> copy submitted for the purposes of international search under Section 802(b-quater) only (and not as part of the international application)		:
(c) <input type="checkbox"/> also in computer readable form (Section 801(a)(ii))		(ii) <input type="checkbox"/> (only where check-box (b)(ii) or (c)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-quater)		:
(i) <input type="checkbox"/> sequence listings		(iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column:		:
(ii) <input type="checkbox"/> tables related thereto		11. <input checked="" type="checkbox"/> other (specify): Subauthorisation		: 1
Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the		Figure of the drawings which should accompany the abstract: 4		
<input type="checkbox"/> sequence listings:		Language of filing of the international application: Swedish		
<input type="checkbox"/> tables related thereto:				
(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)				

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

22 January 2003



Anna Pihl

Authorized Agent

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA/	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

Date of receipt of the record copy by the International Bureau:

For International Bureau use only

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

AWAPATENT AB
Box 5117
S-200 71 Lund
SwedenDate of mailing (day/month/year)
18 June 2003 (18.06.03)Applicant's or agent's file reference
PC-21001834International application No.
PCT/SE03/00107

RECEIVED

2003 -07- 04

AWAPATENT

IMPORTANT NOTIFICATION

International filing date (day/month/year)
23 January 2003 (23.01.03)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

LUNDAHL, Sven-Ingvar
Kårevägen 21
S-360 51 Hovmantorp
Sweden

State of Nationality

SE

State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

SIBIL INTERNATIONAL AB
Kårevägen 21
S-360 51 Hovmantorp
Sweden

State of Nationality

SE

State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

Please be informed that the person indicated in Box 2 has been recorded as applicant for the above mentioned file for all designated states.

4. A copy of this notification has been sent to:

☐ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☐ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 338-70-90

Authorized officer

Carlos NARANJO

Telephone No. (41-22) 338 8349

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PC-21001834	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE03/00107	International filing date (day/month/year) 23.01.2003	Priority date (day/month/year) 30.01.2002
International Patent Classification (IPC) or national classification and IPC B65H 75/14, B65H 75/50		
Applicant Sibil International AB et al		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of _____ sheets.</p>
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>

Date of submission of the demand 06.08.2003	Date of completion of this report 01.12.2003
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 Form PCT/IPEA/409 (cover sheet) (January 1998)	Authorized officer Tommy Blomberg / MRo Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE03/00107

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE03/00107

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-12</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-12</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-12</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US 1437954 A
D2: GB 1303063 A
D3: WO 9104218 A1
D4: SE 469836 B

The cited documents represent the general state of the art.
The invention defined in claims 1-12 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed bobbin and the method of manufacturing a bobbin. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-12 is novel and is considered to involve an inventive step. The invention is industrially applicable.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
7 August 2003 (07.08.2003)

PCT

(10) International Publication Number
WO 03/064308 A1(51) International Patent Classification⁷: B65H 75/14, 75/50

(21) International Application Number: PCT/SE03/00107

(22) International Filing Date: 23 January 2003 (23.01.2003)

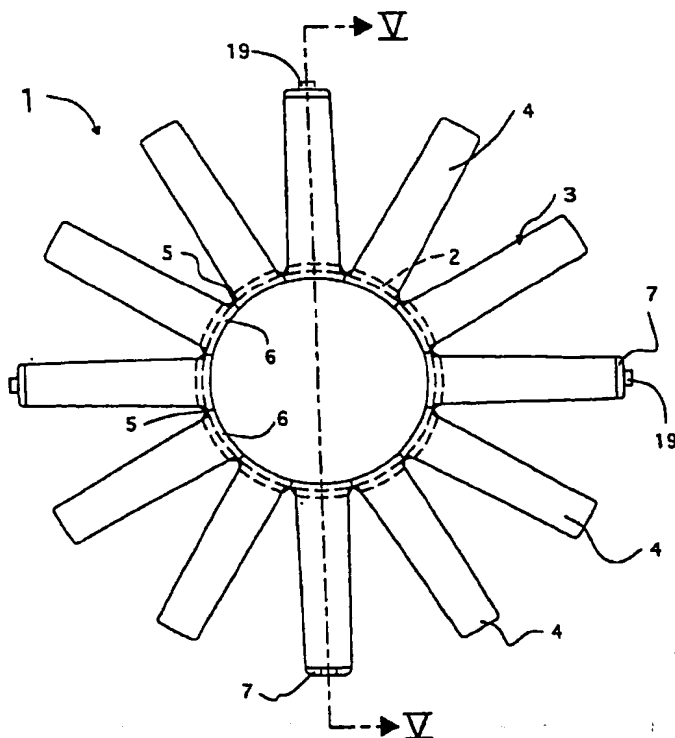
(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
0200251-7 30 January 2002 (30.01.2002) SE(71) Applicant: SIBIL INTERNATIONAL AB [SE/SE];
Kårevägen 21, S-360 51 Hovmantorp (SE).(74) Agent: AWAPATENT AB; Box 5117, S-200 71 Lund
(SE).(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.(84) Designated States (*regional*): ARIPO patent (GH, GM, KR, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: PLASTIC BOBBIN AND A METHOD OF MANUFACTURING SUCH A BOBBIN



(57) Abstract: A bobbin (1) of plastic has a cylinder (2) and, formed integrally therewith, circumferential end flanges (3) and is made of a U-shaped channel. Each end flange (3) consists of a plurality of spaced-apart, essentially radial flange elements (4) which are distributed along the circumference of the cylinder (2). In a method of manufacturing such a bobbin, a U-shaped channel is made by injection moulding. The U shaped channel is given such a shape that its side walls consist of a plurality of spaced-apart wall elements which are distributed along the length of the channel. The channel is bent to form the cylinder (2) and its ends are connected with each other in this bent position.

WO 03/064308 A1

4/10/04

PLASTIC BOBBIN

Field of the Invention

The present invention relates to a bobbin of plastic, which has a cylinder and, formed integrally therewith, circumferential end flanges and is made of a U-shaped channel, and a method of manufacturing such a bobbin, in which method a U-shaped channel is made and bent to form said cylinder with end flanges, the ends of the channel being connected with each other in this bent position.

Background Art

Bobbins are used for winding, inter alia, cable, and they can be manufactured in various ways and of various materials. In small sizes, up to about 400 mm, they are in most cases made of plastic or paper. They can be manufactured in one piece or several pieces which are then assembled.

GB-1,303,063 discloses manufacture of a bobbin by bending a plastic channel back on itself so that its ends meet and a cylinder with circumferential end flanges is formed, after which the ends are joined by welding or gluing. The plastic channel is made by extrusion or thermoforming of a plastic strip and is provided with transverse corrugations to allow it to be bent to a cylinder.

The drawbacks of this method of manufacture is that it is time-consuming since manufacture takes place in several steps and different machines or tools are required for each step, and that the corrugation requires a great consumption of material.

Summary of the Invention

The object of the invention is to provide a method that makes it possible to simplify the manufacture of a bobbin of the above type and to reduce the consumption of material. A further object of the invention is to provide such a bobbin which can be made of a smaller amount of

material compared with the prior-art bobbin of a corresponding size and further has the advantage that it can be transported and stored in a more rational manner.

This object is achieved as regards the bobbin by a
5 bobbin which is of the type mentioned by way of introduction and characterised in that each end flange consists of a plurality of spaced-apart essentially radial flange elements which are distributed along the circumference of the cylinder.

10 For the end flanges of the bobbin to have sufficient strength, its flange elements have over their entire radial extent preferably an essentially constant extension in the circumferential direction, the flange elements of each end flange having a total extension in
15 the circumferential direction which is essentially equal to the circumference of the cylinder.

In order to facilitate bending, the bobbin has preferably a plurality of axial grooves which are formed in the outer circumferential surface of the cylinder,
20 each groove extending the entire length of the cylinder between a point between two adjoining flange elements of one end flange and a point between two adjoining flange elements of the other end flange.

Each flange element has at its radially inner end
25 suitably a lug, which extends past the inner circumferential surface of the cylinder and has a circumferential extent that decreases radially inwards. The U-shaped channel can be bent until each lug has been brought into abutment against a neighbouring lug. Thus the lugs make
30 it easier to form the U-shaped channel to a cylinder which retains its cylindrical shape and does not collapse when used. In an alternative embodiment, the inner circumferential surface of the cylinder has a plurality of axial grooves, each groove extending the entire length of
35 the cylinder between a point between two adjoining flange elements of one end flange and a point between two adjoining flange elements of the other end flange. The

grooves in the inner circumferential surface of the cylinder are preferably located opposite to the grooves in the outer circumferential surface thereof and are preferably wedge-shaped in cross-section.

- 5 Preferably, at least one flange element of one end flange has at its radially outer end an articulated projection which at its free end is hookable onto the other end flange.

10 The above object is achieved as regards the method by the U-shaped channel being made by injection moulding and given such a shape that its side walls consist of a plurality of spaced-apart wall elements which are distributed along the length of the channel.

15 The ends of the channel are preferably connected with each other by protrusions, which are formed on a projection of the base of the channel, which projection projects at one channel end in the longitudinal direction of the channel, being inserted into holes which are formed in the base of the channel at the other channel end.

20 In order to facilitate bending of the channel, its base is during injection moulding given transverse inner grooves which extend the entire width of the base between a point between two adjoining wall elements of one channel wall and a point between two adjoining wall elements
25 of the other channel wall.

30 Preferably, each wall element is during injection moulding at its end connected with the base provided with a lug which extends past the base and has an extent decreasing in the longitudinal direction of the channel, away from the wall element, the channel being bent until each lug is brought into abutment against a neighbouring
35 lug, the lugs forming stops which make the channel form to a cylinder in connection with bending. Alternatively, the base of the channel can during injection moulding be given transverse outer grooves which extend the entire
width of the base between a point between two adjoining

wall elements of one channel wall and a point between two adjoining wall elements of the other channel wall.

Brief Description of the Drawings

The invention will now be described in more detail
5 by means of a preferred but non-limiting embodiment and with reference to the accompanying drawings.

Fig. 1 is a side view of a U-shaped channel which is used to manufacture a bobbin according to the invention.

Fig. 2 is a sectional view along line II-II in
10 Fig. 1 and shows a channel segment of the channel.

Fig. 3A shows the channel segment in section along line IIIA-IIIA in Fig. 2.

Fig. 3 shows the channel segment in section along line IIIB-IIIB in Fig. 2.

15 Fig. 4 is an end view of a bobbin which is made of a bent channel according to Figs 1 and 2.

Fig. 5 is a sectional view along line V-V in Fig. 4 and shows the bobbin.

Description of Preferred Embodiments

20 The bobbin 1 according to the invention is made of plastic and has a cylinder 2 with a circumferential end flange 3 at each cylinder end. Each end flange 3 consists of a plurality of spaced-apart radial flange elements 4, which are perpendicular to the cylinder axis and uniformly distributed along the circumference of the cylinder 2.
25 In the preferred embodiment, all flange elements 4 have the same shape and size, but they could just as well have different shapes and/or sizes. The flange elements 4 have essentially the shape of an elongate rectangle, each
30 flange element being connected with the cylinder 2 at one short side of the rectangle. The total width of the flange elements 4 of each end flange 3 is approximately equal to the circumference of the cylinder 2. For increased strength, the flange elements 4 are internally
35 provided with radial stiffeners 14, or they are arched in cross-section.

Each flange element 4 of one end flange 3 is arranged opposite to a flange element 4 of the other end flange 3. Between the flange elements 4 in each pair of adjoining flange elements, the cylinder 2 has axial grooves 5 in its outer circumferential surface. The grooves 5 extend the entire length of the cylinder 2.

In an alternative embodiment (not shown), also the inner circumferential surface of the cylinder has axial grooves between the flange elements 4 in each pair of adjoining flange elements, which grooves extend the entire length of the cylinder 2 and are wedge-shaped in cross-section.

Each cylinder portion 2' between two adjoining grooves 5 is outwardly arched in cross-section, as is evident from Fig. 3B, or inwardly arched in cross-section. To provide a more rigid cylinder, these portions 2' can be made more pointed in cross-section, as indicated by dashed lines in Fig. 3B.

Each flange element 4 has at its radially inner end a lug 6 which extends past the inner circumferential surface of the cylinder 2 and has a circumferential extent that tapers radially inwards (see Figs 1 and 4). Each lug 6 tapers radially inwards in such a manner that, seen in the axial direction, it has the shape of a radially outer part of a sector of a circle, whose radius is equal to the inner radius of the cylinder 2 and whose point angle is $360^\circ/N$, where N equals the number of flange elements of each end flange 3.

One or more flange elements 4 of one end flange are at their radially outer end provided with an articulated projection 7, whose free end is to be hooked onto a hook 19 on a flange element 4 of the other end flange, so that the projection 7 forms a transport cover for a cable wound onto the bobbin.

The outer circumferential surface of the cylinder 2 has a hook 8 on which a cable end can be fastened when winding a cable onto the bobbin.

According to the invention, the bobbin 1 is manufactured by a U-shaped channel 9 being injection moulded of plastic and then being bent back on itself to form a cylinder 2 with an end flange 3 at each cylinder end.

5 The base 10 of the U-shaped channel 9 forms the cylinder 2 and its walls 11 form the end flanges 3. To allow the channel 9 to be bent back on itself, its walls 11 consist of a plurality of essentially rectangular wall elements 12 which are spaced from each other and uniformly distributed along the length of the channel 9. When the channel 10 9 is bent, the wall elements 12 are moved apart in the manner as is evident from Fig. 4.

The channel ends 13 are connected with each other by protrusions 15, here having the shape of hooks, which 15 are formed on a projection 17 of the base 10 of the channel, said projection projecting at one channel end 13 in the longitudinal direction of the channel 9, being inserted into holes 16 which are formed in the base of the channel at the other channel end 13 (Fig. 2). Of 20 course, it is also conceivable to form the holes in the projection 17 at one channel end 13 and the protrusions at the other channel end 13.

The base projection 17 provided with the protrusions 15 at one channel end 13 also has an opening 18 through 25 which the hook 8, which is formed at the other channel end 13, is inserted when interconnecting the channel ends 13.

In an alternative embodiment (not shown), the channel ends are connected with each other by the projection 30 at one channel end being inserted between two holder elements extended in the longitudinal direction of the channel and being essentially L shaped in cross-section, at the channel end opposite to the projection. The first L legs of the two holder elements are attached to the 35 base. The two free second L legs are oriented towards each other and form supporting portions for the projection when this is inserted between the holder elements

when interconnecting the channel ends. A stop lug is arranged on the base of the channel between the two holder elements, the projection being formed with a hole into which the stop lug is inserted once the channel ends are connected with each other. The holder elements are preferably arranged on the outside of the base of the channel so that the completed bobbin obtains a smooth outer circumferential surface.

The base 10 of the channel 9 is formed with transverse inner grooves 5 which make the channel easier to bend.

To facilitate the forming of a cylinder 2 when bending the U-shaped channel 9, and to prevent the cylinder from collapsing when using the bobbin 1, each wall element 12 is provided with a lug 6 which extends past the base 10 and has an extent decreasing in the longitudinal direction of the channel 9, away from the wall element. The channel 9 can be bent until each lug 6 is brought into abutment against a neighbouring lug 6. Alternatively, the base 10 of the channel is during injection moulding given transverse outer grooves which extend the entire width of the base between a point between two adjoining wall elements 12 of one channel wall 11 and a point between two adjoining wall elements 12 of the other channel wall 11.

The bobbin according to the invention can be used not only for winding cable, but also for winding, for instance, rope, line, hose, emery cloth and the like. The bobbin can also serve as a spacing or insulating element in large drums or pipes with cables inserted into the tube which is formed of the cylinder of the bobbin.

CLAIMS

1. A bobbin (1) of plastic, which has a cylinder
5 (2) and, formed integrally therewith, circumferential
end flanges (3) and is made of a U-shaped channel (9),
c h a r a c t e r i s e d in that the U-shaped channel (9)
is made by injection moulding in one piece, and that each
end flange (3) consists of a plurality of spaced-apart,
10 essentially radial flange elements (4) which are distri-
buted along the circumference of the cylinder (2).

2. A bobbin as claimed in claim 1, in which the
flange elements (4) over the entire radial extent have
an essentially constant extension in the circumferential
15 direction, the flange elements (4) of each end flange (3)
having a total extension in the circumferential direction
which is essentially equal to the circumference of the
cylinder (2).

3. A bobbin as claimed in claim 1 or 2, in which a
20 plurality of axial grooves (5) are formed in the outer
circumferential surface of the cylinder (2), each groove
(5) extending the entire length of the cylinder (2)
between a point between two adjoining flange elements
(4) of one end flange (3) and a point between two adjoin-
25 ing flange elements (4) of the other end flange (3).

4. A bobbin as claimed in claim 1 or 2, in which a
plurality of axial grooves are formed in the inner cir-
cumferential surface of the cylinder (2), each groove
extending the entire length of the cylinder (2) between
30 a point between two adjoining flange elements (4) of one
end flange (3) and a point between two adjoining flange
elements (4) of the other end flange (3).

5. A bobbin as claimed in claims 3 and 4, in which
the grooves in the inner circumferential surface of the
35 cylinder (2) are located opposite to the grooves (5) in
the outer circumferential surface thereof and are wedge-
shaped in cross-section.

6. A bobbin as claimed in any one of claims 1-3, in which each flange element (4) at its radially inner end has a lug (6) which extends past the inner circumferential surface of the cylinder (2) and has a circumferential extent that decreases radially inwards.

7. A bobbin as claimed in any one of claims 1-6, in which at least one flange element (4) of one end flange (3) at its radially outer end has an articulated projection (7) which at its free end is hookable onto the other end flange (3).

8. A method of manufacturing a bobbin of plastic, which has a cylinder (2) and, formed integrally therewith, circumferential end flanges (3), in which method a U-shaped channel (9) is made in one piece and bent to form said cylinder (2) with end flanges (3), the ends (13) of the channel being connected with each other in this bent position, characterised in that the U-shaped channel (9) is made by injection moulding and given such a shape that its side walls (11) consist of a plurality of spaced-apart wall elements (12) which are distributed along the length of the channel (9).

9. A method as claimed in claim 8, in which the channel ends (13) are connected with each other by protrusions (15), which are formed on a projection (17) of the base (10) of the channel, which projection projects at one channel end in the longitudinal direction of the channel (9), being inserted into holes (16) which are formed in the base of the channel at the other channel end.

10. A method as claimed in claim 8 or 9, in which the base (10) of the channel during injection moulding is given transverse inner grooves which extend the entire width of the base between a point between two adjoining wall elements (12) of one channel wall (11) and a point between two adjoining wall elements (12) of the other channel wall (11).

11. A method as claimed in any one of claims 8-10,
in which each wall element (12) during injection moulding
is at its end connected with the base (10) provided with
a lug (6) which extends past the base (10) and has an
5 extent decreasing in the longitudinal direction of the
channel (9), away from the wall element (12), and the
channel is bent until each lug is brought into abutment
against a neighbouring lug.

12. A method as claimed in any one of claims 8-10,
10 in which the base (10) of the channel during injection
moulding is given transverse outer grooves which extend
the entire width of the base between a point between two
adjoining wall elements (12) of one channel wall (11) and
a point between two adjoining wall elements (12) of the
15 other channel wall (11).

ABSTRACT

5 A bobbin (1) of plastic has a cylinder (2) and, formed integrally therewith, circumferential end flanges (3) and is made of a U-shaped channel. Each end flange (3) consists of a plurality of spaced-apart, essentially radial flange elements (4) which are distributed along the circumference of the cylinder (2).

10 In a method of manufacturing such a bobbin, a U-shaped channel is made by injection moulding. The U shaped channel is given such a shape that its side walls consist of a plurality of spaced-apart wall elements which are distributed along the length of the chan-
15 nel. The channel is bent to form the cylinder (2) and its ends are connected with each other in this bent position.

Elected for publication: Fig. 4

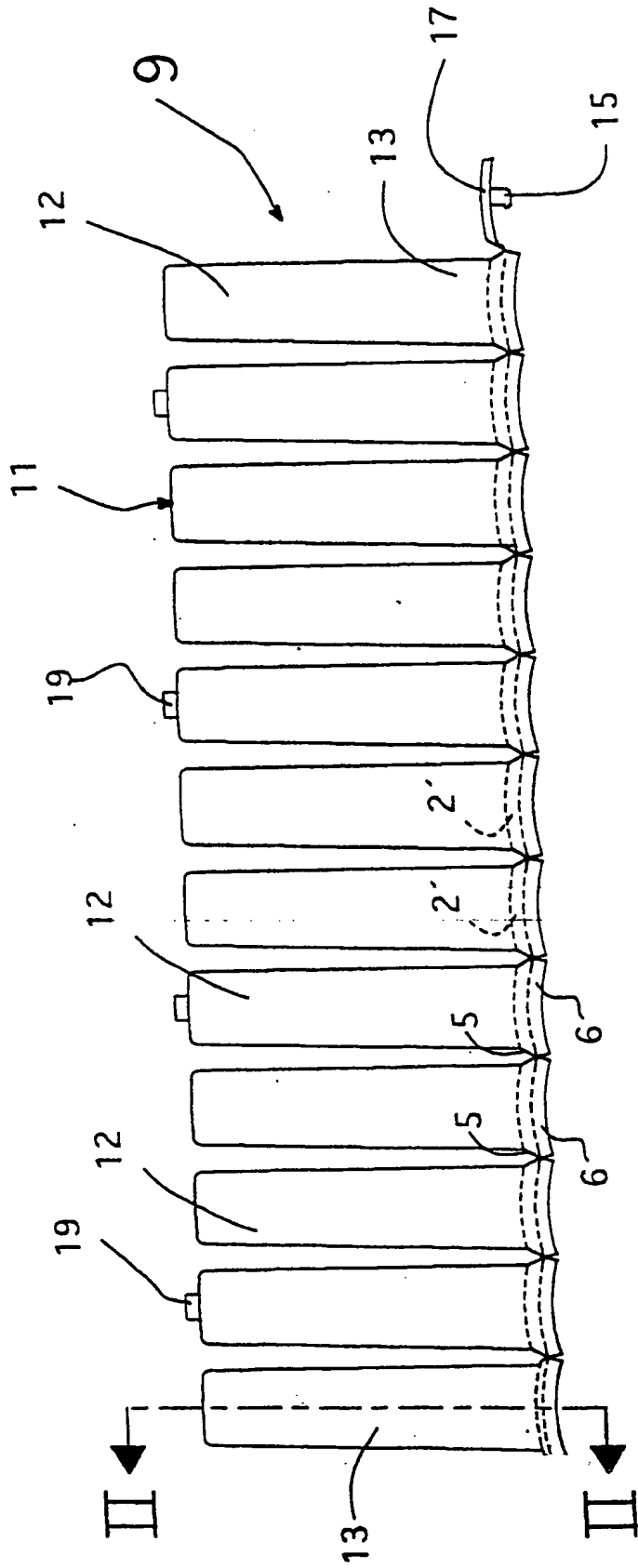


FIG. 1

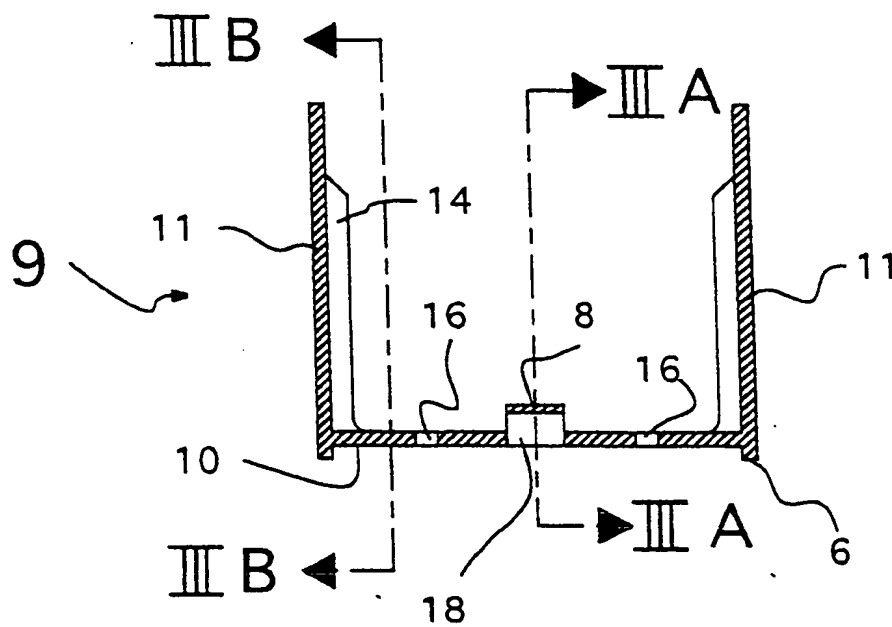


FIG. 2

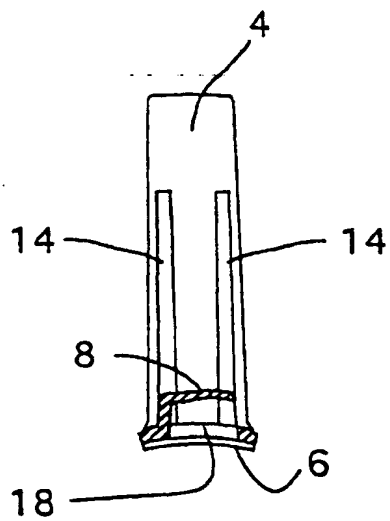


FIG. 3A

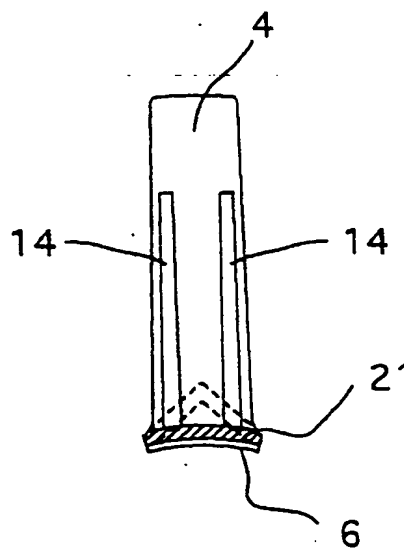


FIG. 3B

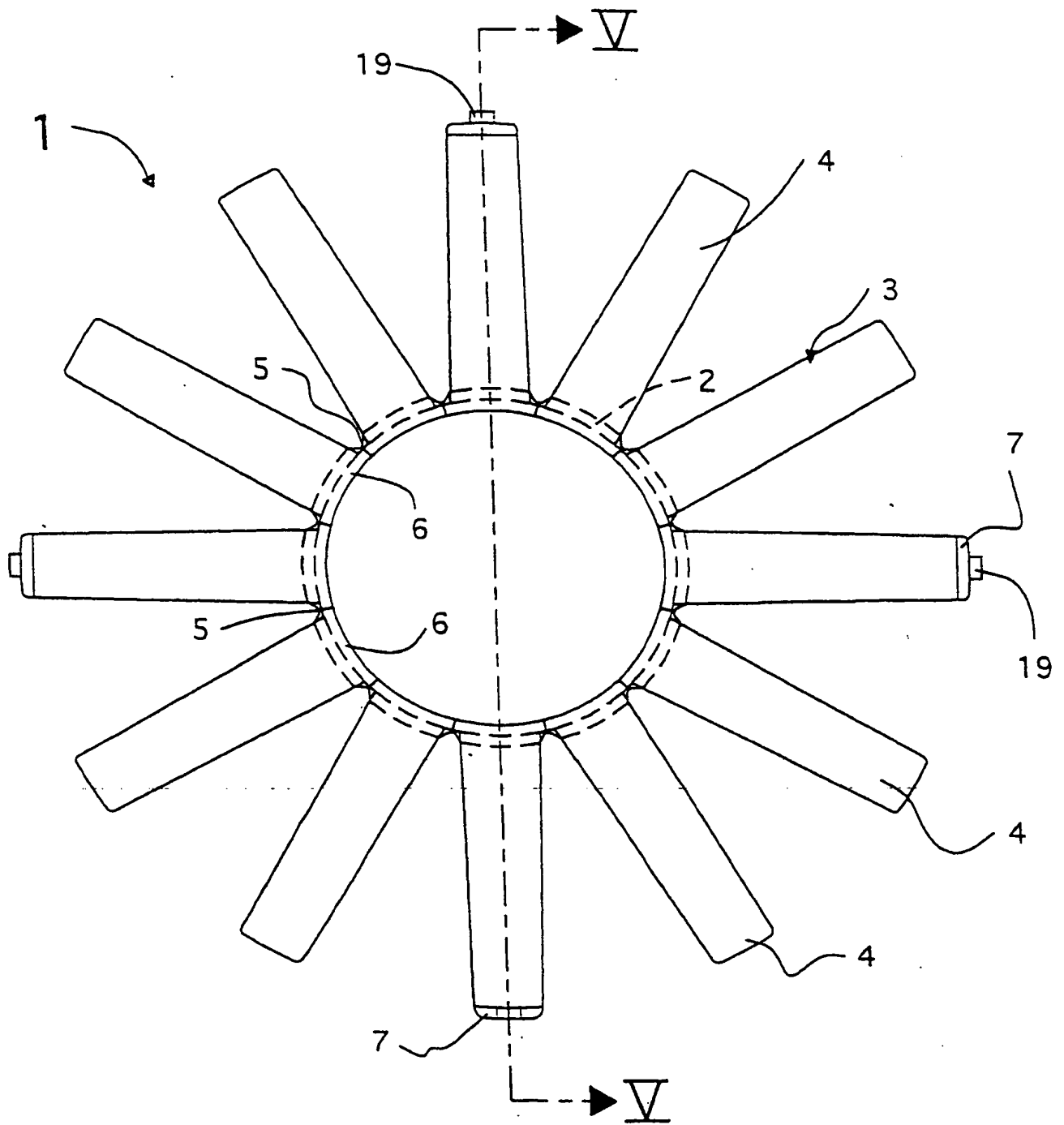


FIG. 4

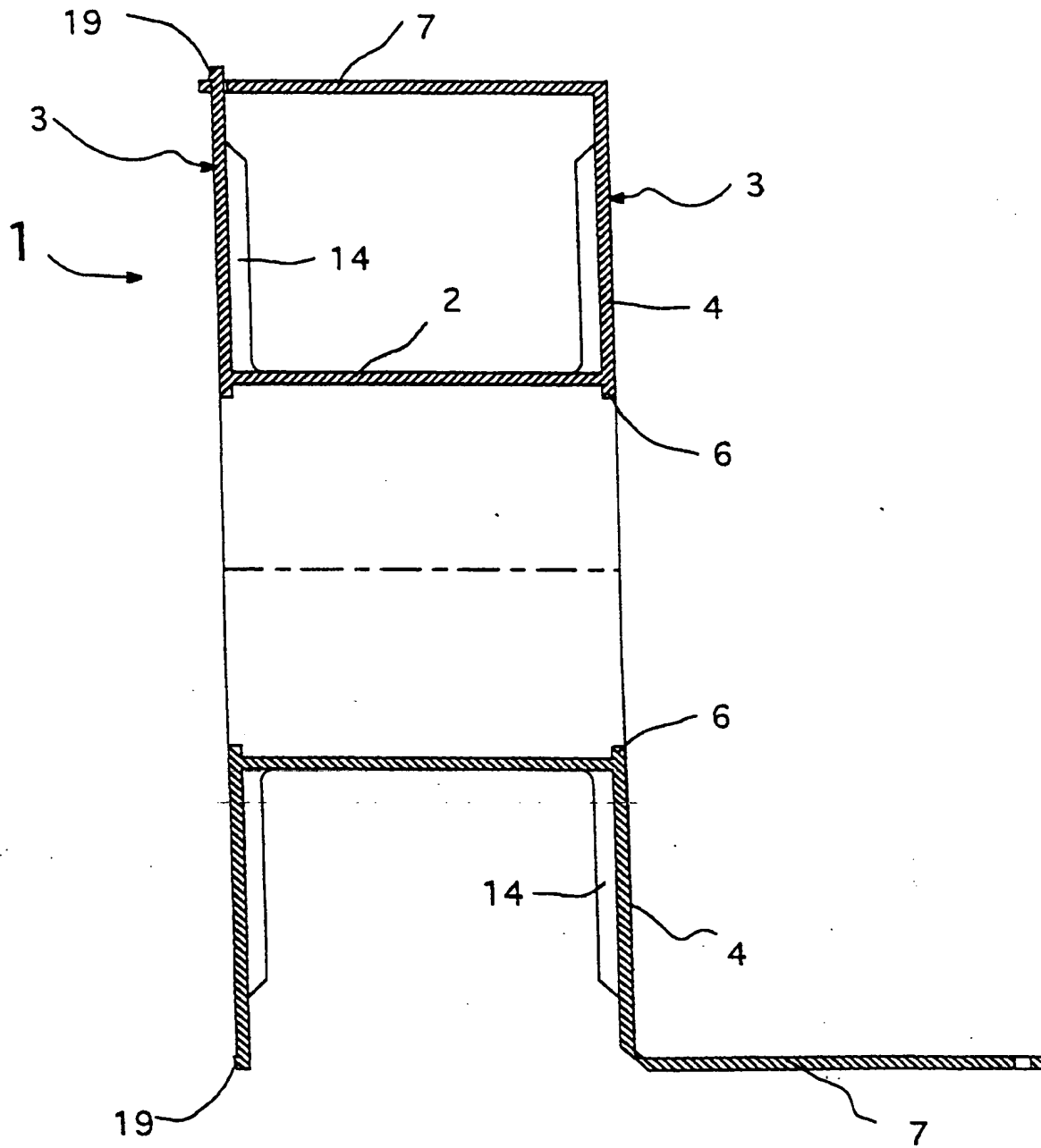


FIG.5

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property
Organization
International Bureau



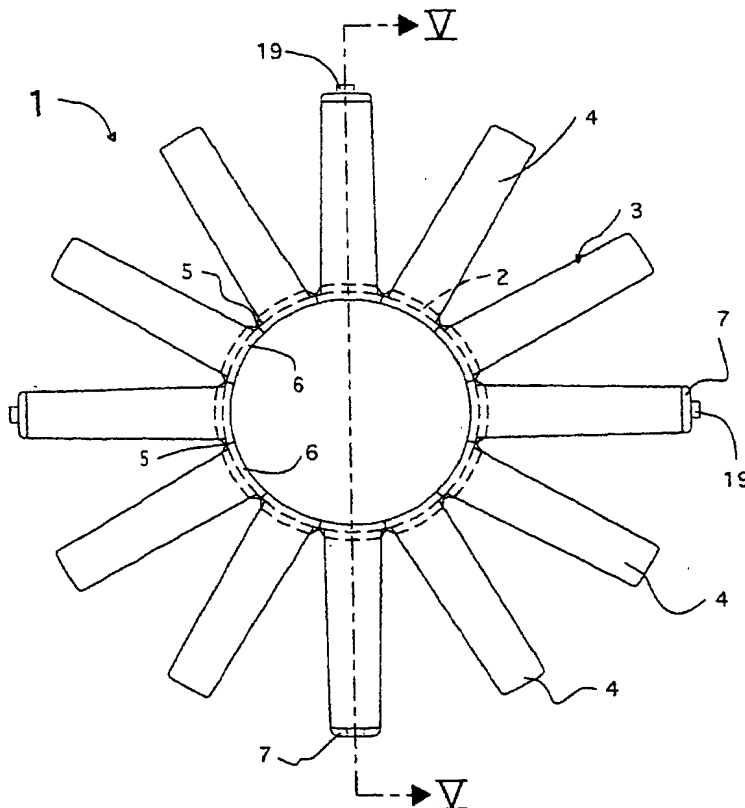
(43) International Publication Date
7 August 2003 (07.08.2003)

PCT

(10) International Publication Number
WO 2003/064308 A1

- (51) International Patent Classification⁷: **B65H 75/14, 75/50**
- (21) International Application Number: **PCT/SE2003/000107**
- (22) International Filing Date: **23 January 2003 (23.01.2003)**
- (25) Filing Language: **Swedish**
- (26) Publication Language: **English**
- (30) Priority Data:
0200251-7 30 January 2002 (30.01.2002) SE
- (71) Applicant (for all designated States except US): **SIBIL INTERNATIONAL AB [SE/SE]; Kårevägen 21, S-360 51 Hovmantorp (SE).**
- (72) Inventor; and
(75) Inventor/Applicant (for US only): **LUNDAHL, Sven-Ingvar [SE/SE]; Kårevägen 21, SE-360 51 Hovmantorp (SE).**
- (74) Agent: **AWAPATENT AB; Box 5117, S-200 71 Malmö (SE).**
- (81) Designated States (national): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.**
- (84) Designated States (regional): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),**

[Continued on next page]

(54) Title: **PLASTIC BOBBIN AND A METHOD OF MANUFACTURING SUCH A BOBBIN**

(57) Abstract: A bobbin (1) of plastic has a cylinder (2) and, formed integrally therewith, circumferential end flanges (3) and is made of a U-shaped channel. Each end flange (3) consists of a plurality of spaced-apart, essentially radial flange elements (4) which are distributed along the circumference of the cylinder (2). In a method of manufacturing such a bobbin, a U-shaped channel is made by injection moulding. The U shaped channel is given such a shape that its side walls consist of a plurality of spaced-apart wall elements which are distributed along the length of the channel. The channel is bent to form the cylinder (2) and its ends are connected with each other in this bent position.



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(48) Date of publication of this corrected version:

1 July 2004

(15) Information about Correction:

see PCT Gazette No. 27/2004 of 1 July 2004, Section II

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00107

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65H 75/14, B65H 75/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPD-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 1437954 A (W.H. BALKE), 5 December 1922 (05.12.22), page 1, line 85 - page 2, line 35 --	1-12
A	GB 1303063 A (BP CHEMICALS LIMITED ET AL), 17 January 1973 (17.01.73), page 2, line 22 - line 51 --	1-12
A	WO 9104218 A1 (PETERSEN, D.), 4 April 1991 (04.04.91), figures 3-4,6, abstract --	1-12
A	SE 469836 B (ERNOL AB), 27 Sept 1993 (27.09.93), page 4, paragraph 4 - page 5 -- -----	1-12

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "B" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

1 April 2003

Date of mailing of the international search report

04-04-2003

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Tommy Blomberg / MRo
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/02/03

International application No.

PCT/SE 03/00107

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	1437954	A	05/12/22	NONE		
GB	1303063	A	17/01/73	NONE		
WO	9104218	A1	04/04/91	AU DK	6431290 A 449489 D	18/04/91 00/00/00
SE	469836	B	27/09/93	DE SE	4231182 A 9102695 A	18/03/93 18/03/93

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00107

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65H 75/14, B65H 75/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 1437954 A (W.H. BALKE), 5 December 1922 (05.12.22), page 1, line 85 - page 2, line 35 --	1-12
A	GB 1303063 A (BP CHEMICALS LIMITED ET AL), 17 January 1973 (17.01.73), page 2, line 22 - line 51 --	1-12
A	WO 9104218 A1 (PETERSEN, D.), 4 April 1991 (04.04.91), figures 3-4,6, abstract --	1-12
A	SE 469836 B (ERNOL AB), 27 Sept 1993 (27.09.93), page 4, paragraph 4 - page 5 -- -----	1-12

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

1 April 2003

Date of mailing of the international search report

04-04-2003

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Tommy Blomberg / MRo

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/02/03

International application No.

PCT/SE 03/00107

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	1437954	A	05/12/22	NONE		
GB	1303063	A	17/01/73	NONE		
WO	9104218	A1	04/04/91	AU DK	6431290 A 449489 D	18/04/91 00/00/00
SE	469836	B	27/09/93	DE SE	4231182 A 9102695 A	18/03/93 18/03/93

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.